fier, a user identifier, or a hand-out identifier. The progress pipeline can include an aggregator service configured to: retrieve a subset of metadata corresponding with a tracking window from a distributed file system that includes at least one journal node, generate a data structure that includes the subset of metadata associated with a particular organization identifier included in the subset of metadata, store the data structure in a memory, and push a reference corresponding to the data structure into a queue. The progress pipeline can include an off-ramp service configured to: process a data structure to generate sorted metadata based on at least one of a class identifier, a hand-out identifier, a context identifier, the user identifier, the directory service identifier, or the internal identifier. The progress pipeline can include a deposit service configured to: associate the progress tracking information with a progress identifier associated with one of the user identifier or the directory service identifier; and store the progress tracking information and the progress identifier in a network-based storage service.

[0011] The client-server architecture and/or the software framework, individually or in combination, can enable instructors and students to interact using interactive lesson plans that incorporate functionality of one or more third-party applications to enhance the learning experience. Other aspects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the described embodiments.

[0012] This Summary is provided merely for purposes of summarizing some example embodiments so as to provide a basic understanding of some aspects of the subject matter described herein. Accordingly, it will be appreciated that the above-described features are merely examples and should not be construed to narrow the scope or spirit of the subject matter described herein in any way. Other features, aspects, and advantages of the subject matter described herein will become apparent from the following Detailed Description, Figures, and Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The disclosure will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements.

[0014] FIG. **1** illustrates a network environment designed to operate within a classroom setting, in accordance with some embodiments.

[0015] FIG. **2** illustrates a client-server architecture implemented to enable progress tracking for client devices in the classroom setting, in accordance with some embodiments.

[0016] FIG. **3** illustrates a graphical user interface of the client application, in accordance with some embodiments.

[0017] FIG. **4** illustrates a client-server relationship between the hand-out service and a client application and/or daemon, in accordance with some embodiments.

[0018] FIG. **5** illustrates a syncing mechanism implemented by the daemon, in accordance with some embodiments.

[0019] FIGS. **6**A-**6**E illustrate a graphical user interface of the client application, in accordance with some embodiments.

[0020] FIG. **7** illustrates a client-server relationship between the hand-out service and a number of client application(s) and/or daemon(s) associated with a plurality of students in a class, in accordance with some embodiments.

[0021] FIGS. **8**A-**8**C illustrate a graphical user interface implemented by a client application on a client device associated with a student, in accordance with some embodiments.

[0022] FIG. **9** illustrates a client-server relationship between the hand-in service and a number of client application(s) and/or daemon(s) for a plurality of students in a class, in accordance with some embodiments.

[0023] FIG. **10** illustrates a client-server relationship between the progress pipeline and a client application and/or daemon, in accordance with some embodiments.

[0024] FIG. **11** illustrates the filtering of progress tracking information by the daemon, in accordance with some embodiments.

[0025] FIG. **12** illustrates the progress pipeline, in accordance with some embodiments.

[0026] FIG. **13** illustrates a client-server relationship between the report service and a client application and/or daemon, in accordance with some embodiments.

[0027] FIGS. **14**A-**14**B illustrate a graphical user interface of the client application, in accordance with some embodiments.

[0028] FIG. **15** is a flow chart of a method for tracking student activity on a client device, in accordance with some embodiments.

[0029] FIG. **16** is a flow chart of a method for processing progress tracking information utilizing one or more services available over a network, in accordance with some embodiments.

[0030] FIG. **17** illustrates a detailed view of an exemplary computing device that can be used to implement the various apparatus and/or methods described herein, in accordance with some embodiments.

DETAILED DESCRIPTION

[0031] Representative applications of methods and apparatus according to the present application are described in this section. These examples are being provided solely to add context and aid in the understanding of the described embodiments. It will thus be apparent to one skilled in the art that the described embodiments may be practiced without some or all of these specific details. In other instances, well known process steps have not been described in detail in order to avoid unnecessarily obscuring the described embodiments. Other applications are possible, such that the following examples should not be taken as limiting.

[0032] In the following detailed description, references are made to the accompanying drawings, which form a part of the description and in which are shown, by way of illustration, specific embodiments in accordance with the described embodiments. Although these embodiments are described in sufficient detail to enable one skilled in the art to practice the described embodiments, it is understood that these examples are not limiting; such that other embodiments may be used, and changes may be made without departing from the spirit and scope of the described embodiments.

[0033] The digital classroom provides students with new opportunities to learn within a rich environment of interactive applications installed on computing devices provided to the students. While devices can allow students to interact with information online that is accessed through a browser or provided through specialized applications, the benefits to